Listing of the Claims:

The following is a complete listing of all the claims in the application, with an indication of the status of each:

1   1. (Currently Amended) A method for ~~the~~ non-destructive chemical
2   analysis of test objects ~~(1)~~ by means of irradiating the test object ~~(1)~~ with
3   neutrons ~~n~~ generated by target-free fusion of concentrically accelerated
4   deuterium ions and measuring the amount of gamma photon quanta and
5   the respective photon energy ~~(E_v)~~ in order to record a photon energy
6   spectrum ~~(6)~~, characterized by
7   - determining characteristic photon energies ~~(E_v)~~ from the amounts
8   of gamma photon radiation from the entire photon energy spectrum ~~(6)~~
9   which exceed background photon radiation, <u>up to and including a photon</u>
10   <u>energy</u> ~~at least as far as the region~~ of 12 MeV, and
11   - determining the elements <u>or</u> ~~and/or~~ isotopes of the test object ~~(1)~~ by
12   assigning the characteristic photon energies ~~(E_v)~~ distributed over the entire
13   photon energy spectrum ~~(6)~~ to corresponding elements and/or isotopes
14   which are in each case stored unambiguously in relation to a photon
15   energy ~~(E_v)~~.

1   2. (Currently Amended) The method <u>of</u> ~~as claimed in~~ claim 1, characterized
2   by quantitative determination of the chemical element composition of the
3   test object ~~(1)~~ by ~~means of~~ measuring the ~~complete measurable range of~~
4   ~~the~~ photon energy spectrum ~~(6)~~ and determining the proportions of the
5   elements <u>or</u> ~~and/or~~ isotopes determined by relating the amount of gamma
6   photon radiation per element <u>or</u> ~~and/or~~ the isotope to the entire amount of
7   photon radiation determined for all the characteristic photon energies ~~(E_v)~~
8   determined.

1   3. (Currently Amended) The method of ~~as claimed in~~ claim 1, characterized
2   by determining the amount of gamma photon radiation by determining the
3   areas of the characteristic pulse curves of the photon energy spectrum ~~(6)~~
4   in the regions of the characteristic photon energies ~~(E_v)~~.

1   4. (Currently Amended) The method of ~~as claimed in~~ claim 1, characterized
2   by recording a base photon energy spectrum of the test chamber without
3   the test object ~~(1)~~ and calculating a photon energy spectrum ~~(6)~~ used for
4   <u>determining the elements or isotopes</u> ~~evaluation~~ from the difference
5   between the <u>test object's</u> photon energy spectrum ~~(6)~~ recorded for the
6   analysis and the base energy spectrum.

1   5. (Currently Amended) The method of ~~as claimed in~~ claim 1, characterized
2   by irradiating sections of the test object ~~(1)~~ from a plurality of directions
3   and evaluating the plurality of measurement results for the purpose of
4   location-dependent analysis of the test object ~~(1)~~.

6. (Withdrawn) A device for the non-destructive chemical analysis of test
objects (1) composing a neutron source (2) for briefly irradiating the test
object (1) with neutrons (n) and comprising at least one photon detector (3)
aimed at the test object (1) in order to measure the quantity of gamma
photon radiation emitted promptly by the test object (1) immediately after
the irradiation from the number of photon quanta and the respective
photon energy (E_v), characterized in that the neutron source (2) is a
neutron generator (2) arranged beside the test object (2) and an evaluation
computing unit (5) being designed to carry out the method as claimed in
claim 1.

7. (Withdrawn) The device as claimed in claim 6, characterized in that the neutron generator (2) is mobile.

8. (Withdrawn) The device as claimed in claim 6, characterized in that the at least one proton detector (3) is shielded by means for the absorption of neutrons.

9. (Withdrawn) The device as claimed in claim 6, characterized by a focusing element between the neutron generator (2) and the test object (1), the focusing element being designed for the thermal adaptation of the neutrons

10. (Withdrawn) A computer program having program code means for carrying out the method as claimed in claim 1, when the computer program is executed on a computer.

11. (Withdrawn) The computer program as claimed in claim 10, having a database, characterized in that the database contains characteristics photon energies (E_γ) of the elements and/or isotopes.

12. (Withdrawn) The computer program having program code means as claimed in claim 10, which are stored on a computer-readable data medium.

13. (Withdrawn) The database having a large number of entries of characteristic photon energies (E_γ) based on associated elements and/or isotopes for use in order to carry out the method as claimed in Claim 1.

1   14. (New) A method for non-destructive chemical analysis of test objects by

2   means of irradiating the test object with neutrons generated by target-free

3   fusion of concentrically accelerated deuterium ions and measuring the

4   amount of gamma photon quanta and the respective photon energy in

5   order to record a photon energy spectrum, characterized by

6   - determining characteristic photon energies from the amounts of

7   gamma photon radiation from the entire photon energy spectrum which

8   exceed background photon radiation, up to and including a photon energy

9   of 12 MeV, and

10   - determining the elements and isotopes of the test object by

11   assigning the characteristic photon energies distributed over the entire

12   photon energy spectrum to the corresponding elements and isotopes which

13   are in each case stored unambiguously in relation to a photon energy.

1   15. (New) The method of claim 14, characterized by quantitative

2   determination of the chemical element composition of the test object by

3   means of measuring the photon energy spectrum and determining the

4   proportions of the elements and isotopes determined by relating the

5   amount of gamma photon radiation per element and the isotope to the

6   entire amount of photon radiation determined for all the characteristic

7   photon energies determined.

1   16. (New) The method of claim 14, characterized by determining the

2   amount of gamma photon radiation by determining the areas of the

3   characteristic pulse curves of the photon energy spectrum in the regions of

4   the characteristic photon energies.

1   17. (New) The method of claim 14, characterized by recording a base

2   photon energy spectrum of the test chamber without the test object and

3   calculating a photon energy spectrum used for the determining the

4   elements and isotopes from the difference between the test object's photon

5   energy spectrum recorded for the analysis and the base energy spectrum.

1   18. (New) The method of claim 14, characterized by irradiating sections of

2   the test object from a plurality of directions and evaluating the plurality of

3   measurement results for the purpose of location-dependent analysis of the

4   test object.